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EXAMINER	
RODRIGUEZ, PAUL L	

ART UNIT	PAPER NUMBER
2125	

DATE MAILED: 07/14/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/679,408	WATANABE ET AL.	
	Examiner	Art Unit	
	Paul L. Rodriguez	2125	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 07 October 2003 is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☒ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 6/18/04.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-19 are presented for examination.

Priority

2. Acknowledgment is made of applicant's claim for foreign priority based on an application filed in Japan on 6/4/02. It is noted, however, that applicant has not filed a certified copy of the 2002-162464 application as required by 35 U.S.C. 119(b).

3. Receipt is acknowledged of papers filed under 35 U.S.C. 119 (a)-(d) based on an application filed in Japan on 6/4/02. Applicant has not complied with the requirements of 37 CFR 1.63(c), since the oath, declaration or application data sheet does not acknowledge the filing of any foreign application. A new oath, declaration or application data sheet is required in the body of which the present application should be identified by application number and filing date.

Drawings

4. Figure 8-11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

5. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

The abstract of the disclosure is objected to because of the term "means". Correction is required. See MPEP § 608.01(b).

6. The disclosure is objected to because of the following informalities:

Page 17 line 4 recites "an command", would be better as "a command".

Page 17 line 15 refers to "response analysis portion 68", previously 66.

Appropriate correction is required.

Claim Objections

7. Claims 9 and 15 are objected to because of the following informalities:

Claim 9 lines 8-9 refer to "the surface", would be better as "a surface" to avoid any possible antecedent issues.

Claim 15 line 3 refers to "the time of shipment", would be better as "a time of shipment" to avoid any possible antecedent issues.

Claim 15 lines 3-4 refers to "a stabilization time obtained", claim 13 also has a stabilization time obtained, unclear if the same or different.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 3, 5-7, 10-12 and 14-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 3 recites the limitation "the movement start point, the movement direction, the movement velocity, the movement acceleration and the movement distance" in lines 2-4. There is insufficient antecedent basis for this limitation in the claim. The term "the" is similar to the term "said" in that it creates a positive recitation, because each of these terms was not previously introduced, they would be better as "a movement start point, a movement directed" etc.

11. Claim 5 recites the limitation "said axis" in line 5. There is insufficient antecedent basis for this limitation in the claim. Previously "X and Y-axis" and "Z-axis".

12. Claim 6 recites the limitation "the movement start point, the movement direction, the movement velocity, the movement acceleration and the movement distance" in lines 2-3. There

is insufficient antecedent basis for this limitation in the claim. The term "the" is similar to the term "said" in that it creates a positive recitation, because each of these terms was not previously introduced, they would be better as "a movement start point, a movement directed" etc.

13. Claim 12 recites the limitation "said obtained positioning response properties" in line 12. There is insufficient antecedent basis for this limitation in the claim. Previously "examining", not obtained.

14. Claim 15 recites the limitation "said two directions" in line 3. There is insufficient antecedent basis for this limitation in the claim.

15. Claim 15 (regarding claim 12) recites the limitation "said pattern storage means" in line 4. There is insufficient antecedent basis for this limitation in the claim.

16. Claim 16 recites the limitation "said control means" in line 2. There is insufficient antecedent basis for this limitation in the claim.

17. Claim 17 recites the limitation "said control means" in line 2. There is insufficient antecedent basis for this limitation in the claim.

18. Due to the number of 35 USC § 112 second paragraph rejections, the examiner has provided a number of examples of the claim deficiencies in the above rejection(s), however, the list of rejections may not be all inclusive. Applicant should refer to these rejections as examples

of deficiencies and should make all the necessary corrections to eliminate the 35 USC § 112 second paragraph problems and place the claims in a proper format.

19. Due to the vagueness and a lack of a clear definition of the terminology and phrases used in the specification and claims, the claims have been treated on their merits as best understood by the examiner.

Claim Rejections - 35 USC § 102

20. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

21. Claims 1-6, 10, 12-16 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Ito et al (U.S. Pat 6,456,896). The claimed invention reads on Ito et al as follows:

Ito et al discloses (claim 1) a machining method for positioning a work and a tool in directions of X-, Y- and Z-axes perpendicular to one another and machining said work (col. 3 lines 30-40, col. 4 lines 35-42), comprising the steps of: moving said work in each of said X- and Y-axis directions relatively to said Z-axis corresponding to an axis of said tool, prior to machining (col. 1 line 58 – col. 2 line 18, col. 4 lines 35-40, col. 5 lines 54-61, col. 11 lines 22-31), examining positioning response properties of said X- and Y-axis directions with respect to

said Z-axis (col. 5 line 33 – col. 6 line 33, discloses a collection of position response properties which are stored and used by the controller during normal operations, all displacement measurements are with respect to X, Y and Z) and positioning said tool in said Z-axis direction based on obtained data of said positioning response properties (col. 2 lines 19-27, col. 11 lines 31-36), (claim 2) a plurality of measuring conditions for confirming said positioning response properties are established in advance (col. 1 line 58 – col. 2 line 18), (claim 3) said measuring conditions clarify the dependence of at least one of the movement start point (col. 6 lines 20-22, retreat position), the movement direction (col. 5 lines 1-9), the movement velocity, the movement acceleration and the movement distance (abstract), (claim 4) said positioning response properties are selected from said obtained data in comparison between movement conditions to be used during machining and said measuring conditions (col. 7 line 7 – col. 11 line 36), (claim 5) wherein control parameters that can change said positioning response properties are prepared in advance (col. 1 line 58 – col. 2 line 18), said control parameters are changed when said obtained data is out of a predetermined range, said positioning response properties are examined, and said tool is positioned in said axis direction based on said control parameters with which said obtained data is within said range (col. 7 line 7 – col. 9 line 56, time based operations determine displacement response), (claim 6) at least one of the movement start time, the movement velocity and the movement start position with which said tool moves in said Z-axis direction is controlled based on said obtained positioning response properties (col. 8 lines 36-48, col. 11 lines 31-36, col. 13 line 34 – col. 14 line 20), (claim 10) wherein said tool is a drill (figure 1, col. 3 lines 27-30), (claim 12) a machining apparatus (figure 1, 2) comprising moving means for moving a table (T) and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another (figure 1, col. 3 lines 31-40), said table being mounted with a work (inherent), said

main shaft holding a tool (col. 3 lines 32-34) said moving means being operated to machine said work (col. 1 lines 11-21, col. 3 lines 27-44), drive means for moving said work in each of said X-axis direction and said Y-axis direction relatively to said Z-axis corresponding to an axis of said tool (col. 4 lines 35-49), prior to machining (col. 5 line 39 – col. 6 line 38), response property detecting means for examining positioning response properties of said X- and Y-axis directions with respect to said Z-axis (reference number 10, col. 1 line 58 – col. 2 line 18) and positioning control means for positioning said tool in said Z-axis direction based on said obtained positioning response properties (col. 2 lines 19-27, col. 11 lines 31-36), (claim 13) a machining apparatus comprising: moving means for moving a table and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another (Figure 1) said table being mounted with a work, said main shaft holding a tool, said moving means being operated to machine said work (inherent), program storage means for storing examination programs and machining programs (reference number 12, col. 3 lines 45-50), analyzing means for reading said programs from said storage means and analyzing said read programs (reference number 11, col. 3 lines 53-65), pattern storage means for storing a pattern and a stabilization time of predetermined moving operation (reference number 14, col. 3 lines 53-65), pattern matching judging means for judging matching between moving operation analyzed by said analyzing means and said moving operation stored in said pattern storage means (col. 5 lines 54-67), drive control means for moving said work and/or said tool in said X- and Y-axis directions (col. 4 lines 35-42), command creating means for creating a Z-axis lowering command to said drive control means (reference number 11, col. 7 line 7 – col. 11 line 36) and response analyzing means for analyzing position response of said work and/or said tool in each of said axes driven by said drive control means (col. 7 line 7 – col. 11 line 36, thermal displacement response controlled),

wherein prior to machining, said table and said tool are moved in two directions perpendicular to said Z-axis corresponding to said main shaft under specified measuring conditions (col. 5 line 10 – col. 6 line 52) a stabilization time required until position response of said moving means reaches and stays within a predetermined allowable range is obtained after a command-reach time of a positioning command (figure 5-7, col. 6 line 53 – col. 7 line 12, each figure shows that after a certain time the displacement amount stabilizes), and at the time of machining, said tool is moved in said Z-axis direction based on said obtained stabilization time (col. 7 line 7 – col. 11 line 36), (claim 14) further comprising parameter storage means for storing a set of predetermined control parameters (col. 1 line 58 – col. 2 line 18), wherein said drive control means acquires said control parameters from said parameter storage means, and moves said work and/or said tool in said X-axis direction and said Y-axis direction based on said control parameters (col. 3 lines 45-65), (claim 15) comprising control means for examining positioning response properties with respect to said two directions at the time of shipment, storing a stabilization time obtained thus into said pattern storage means, and comparing said stored stabilization time with a stabilization time examined after installation, so as to judge installation conditions (col. 11 lines 3-11, col. 12 line 4 – col. 13 line 5), (claim 16) said control means concludes that there is a trouble in a specific position of a base supporting said apparatus when said stabilization time varies widely in accordance with a coordinate value of a movement start point examined after installation (col. 4 lines 21-26, if an alarm and parameters are shown, then considered inherent), (claim 18) said tool is a drill (figure 1, col. 3 lines 27-30). Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

22. Claims 1-6, 8-10 and 12-18 are rejected under 35 U.S.C. 102(e) as being anticipated by Kakino (U.S. Pat 6,501,997). The claimed invention reads on Kakino as follows:

Kakino discloses (claim 1) a machining method for positioning a work and a tool in directions of X-, Y- and Z-axes perpendicular to one another and machining said work (col. 4 line 49 – col. 5 line 15, col. 5 lines 32-42), comprising the steps of moving said work in each of said X- and Y-axis directions relatively to said Z-axis corresponding to an axis of said tool, prior to machining (col. 5 lines 6-15), examining positioning response properties of said X- and Y-axis directions with respect to said Z-axis (col. 2 lines 31-65, col. 7 lines 25-34), and positioning said tool in said Z-axis direction based on obtained data of said positioning response properties (col. 6 line 14 – col. 7 line 49), (claim 2) a plurality of measuring conditions for confirming said positioning response properties are established in advance (col. 2 lines 31-45), (claim 3) said measuring conditions clarify the dependence of at least one of the movement start point, the movement direction, the movement velocity, the movement acceleration and the movement distance (col. 2 line 45 – col. 3 line 6) (claim 4) said positioning response properties are selected from said obtained data in comparison between movement conditions to be used during machining and said measuring conditions (response properties are sensed during machining movement and non-machining movement), (claim 5) control parameters that can change said positioning response properties are prepared in advance, said control parameters are changed when said obtained data is out of a predetermined range, said positioning response properties are examined, and said tool is positioned in said axis direction based on said control parameters with which said obtained data is within said range (col. 2 lines 15-19, col. 3 lines 12-36), (claim 6) at least one of the movement start time, the movement velocity and the movement start position

with which said tool moves in said Z-axis direction is controlled based on said obtained positioning response properties (col. 2 lines 31-45), (claim 8) an allowable range of stabilization is established in accordance with machining accuracy, and said positioning response properties of said X- and Y-axis directions with respect to said Z-axis are examined in said established allowable range of stabilization (col. 12 lines 30-38, col. 13 lines 1-17), (claim 9) a machining method for positioning a work and a tool in directions of X-, Y- and Z-axes perpendicular to one another and machining said work (col. 4 line 49 – col. 5 line 15, col. 5 lines 32-42), comprising the steps of setting an axis of said tool as said Z-axis (col. 4 line 66 – col. 5 line 2, col. 5 lines 17-22), and obtaining a delay of Z-axis position response of a main shaft holding said tool (col. 3 lines 48-54, col. 9 lines 5-22), prior to machining and setting a movement start time in said X- and Y-axes at a time point when time obtained by adding said delay of Z-axis position response of said main shaft to time required for a forward end of said tool inside said work to lift back to the surface of said work has passed since a time point when said forward end of said tool reached a cutting distance (col. 3 lines 48-54, col. 9 lines 5-22), (claim 10) wherein said tool is a drill (reference number 10), (claim 12) a machining apparatus comprising: moving means for moving a table and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another, said table being mounted with a work, said main shaft holding a tool, said moving means being operated to machine said work (figure 1, col. 4 line 61 – col. 5 line 15), drive means for moving said work in each of said X-axis direction and said Y-axis direction relatively to said Z-axis corresponding to an axis of said tool, prior to machining (col. 5 lines 6-15), response property detecting means for examining positioning response properties of said X- and Y-axis directions with respect to said Z-axis (col. 2 lines 31-65), and positioning control means for positioning said tool in said Z-axis direction based on said obtained positioning

response properties (figure 3, col. 7 lines 12-34), (claim 13) a machining apparatus (figure 1-3) comprising moving means for moving a table and a main shaft relatively to each other in directions of X-, Y- and Z-axes perpendicular to one another, said table being mounted with a work, said main shaft holding a tool, said moving means being operated to machine said work (col. 4 line 16 – col. 5 line 15), program storage means for storing examination programs and machining programs (reference number 22), analyzing means for reading said programs from said storage means and analyzing said read programs (reference number 21) pattern storage means for storing a pattern and a stabilization time of predetermined moving operation (reference number 40) pattern matching judging means for judging matching between moving operation analyzed by said analyzing means and said moving operation stored in said pattern storage means (reference number 20) drive control means for moving said work and/or said tool in said X- and Y-axis directions (reference number M_1, M_2) command creating means for creating a Z-axis lowering command to said drive control means (reference number 20) and response analyzing means for analyzing position response of said work and/or said tool in each of said axes driven by said drive control means (col. 6 line 14 – col. 7 line 34), wherein prior to machining, said table and said tool are moved in two directions perpendicular to said Z-axis corresponding to said main shaft under specified measuring conditions, a stabilization time required until position response of said moving means reaches and stays within a predetermined allowable range is obtained after a command-reach time of a positioning command, and at the time of machining, said tool is moved in said Z-axis direction based on said obtained stabilization time (col. 12 lines 30-38, col. 13 line 1-17), (claim 14) parameter storage means for storing a set of predetermined control parameters (reference number 20, 40,41), wherein said drive control means acquires said control parameters from said parameter storage means, and

moves said work and/or said tool in said X-axis direction and said Y-axis direction based on said control parameters (col. 7 lines 12-34), (claim 15) control means for examining positioning response properties with respect to said two directions at the time of shipment, storing a stabilization time obtained thus into said pattern storage means, and comparing said stored stabilization time with a stabilization time examined after installation, so as to judge installation conditions (col. 2 lines 15-19), (claim 16) said control means concludes that there is a trouble in a specific position of a base supporting said apparatus when said stabilization time varies widely in accordance with a coordinate value of a movement start point examined after installation (col. 11 line 52 – col. 12 line 60, calibration of equipment after installation is well known), (claim 17) said control means judges swinging of said apparatus based on magnitude of overshoot/undershoot of a response waveform and said stabilization time examined after installation, so as to estimate installation conditions and/or floor rigidity (col. 3 lines 12-36, testing of equipment after installation is known) and (claim 18) wherein said tool is a drill (reference number 10). Examiner would like to point out that any reference to specific figures, columns and lines should not be considered limiting in any way, the entire reference is considered to provide disclosure relating to the claimed invention.

Claim Rejections - 35 USC § 103

23. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

24. Claims 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (U.S. Pat 6,456,896) in view of Hamaya (U.S. Pat 5,189,352).

Ito et al teaches most all of the instant invention as applied to claims 1-6 and 12-16 above. Ito et al fails to teach wherein the work is a printed wiring board.

Hamaya teaches a numerically controlled drilling machine that controls a work positioning apparatus in the X and Y axis and controls a drill in the Z axis, (figure 1) and teaches where the work is a printed wiring board (col. 1 lines 5-13, 27-33 and col. 3 line 55 – col. 4 line 10).

Ito et al and Hamaya are analogous art because they are both related to a three axis drilling machine with computer control.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the printed wiring board as a work of Hamaya in the machine tool of Ito et al because it is well known in the art to machine a printed wiring board in a NC drilling machine and Hamaya teaches a system that can rapidly restart after a temporary loss of operating power (col. 2 lines 34-45).

25. Claims 11 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kakino (U.S. Pat 6,501,997) in view of Hamaya (U.S. Pat 5,189,352).

Kakino teaches most all of the instant invention as applied to claims 1-6, 8, 9 and 12-18 above. Ito et al fails to teach wherein the work is a printed wiring board.

Hamaya teaches a numerically controlled drilling machine that controls a work positioning apparatus in the X and Y axis and controls a drill in the Z axis, (figure 1) and teaches where the work is a printed wiring board (col. 1 lines 5-13, 27-33 and col. 3 line 55 – col. 4 line 10).

Kakino and Hamaya are analogous art because they are both related to a three axis drilling machine with computer control.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the printed wiring board as a work of Hamaya in the machine tool of Kakino because it is well known in the art to machine a printed wiring board in a NC drilling machine and Hamaya teaches a system that can rapidly restart after a temporary loss of operating power (col. 2 lines 34-45).

26. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito et al (U.S. Pat 6,456,896) in view of Miyajima et al (U.S. Pat 5,931,070).

Ito et al teaches most all of the instant invention as applied to claims 1-6 above. Ito et al fails to teaches wherein said movement start position is established to be shorter than a predetermined air-cut distance by a distance Lc obtained from an equation: Lc=Vz(Ta-Ts) using a difference Tc between movement time Ta and stabilization time Ts and a lowering velocity Vz.

Miyajima teaches a three axis CNC tool that moves a work 28 in an X and Y axis, prior to moving a tool in a Z axis, where it is determined that the movement start position is established shorter than a predetermined air-cut distance (abstract, figure 4, 5, col. 4 line 29 – col. 6 line 39). While a specific formula is not found in Miyajima et al it is clear from their teachings that the movement of the Z axis is started prior to the completion of the X, Y axis movement, in a sense shorter then a predetermined air-cut distance, by a predetermined distance, it is considered obvious that the timing of Miyajima would take into consideration proper work positioning prior to actuating to tool, therefore stabilization of a movement would be obvious.

Ito et al and Miyajima are analogous art because they are both related to three axis tool operations and control.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the timing of Miyajima in the machine tool of Ito et al because Miyajima teaches machine tool control method, wherein a tool operated by a servo motor controlled by a CNC unit, a positioning of a table for loading a workpiece and the driving of the tool are controlled by a common CNC unit, and as a result, operation can be carried out at a low cost and at a high speed (col. 1 lines 39-45).

27. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kakino (U.S. Pat 6,501,997) in view of Miyajima et al (U.S. Pat 5,931,070).

Kakino teaches most all of the instant invention as applied to claims 1-6 above. Kakino fails to teaches wherein said movement start position is established to be shorter than a predetermined air-cut distance by a distance Lc obtained from an equation: Lc=Vz(Ta-Ts) using a difference Tc between movement time Ta and stabilization time Ts and a lowering velocity Vz.

Miyajima teaches a three axis CNC tool that moves a work 28 in an X and Y axis, prior to moving a tool in a Z axis, where it is determined that the movement start position is established shorter than a predetermined air-cut distance (abstract, figure 4, 5, col. 4 line 29 – col. 6 line 39). While a specific formula is not found in Miyajima et al it is clear from their teachings that the movement of the Z axis is started prior to the completion of the X, Y axis movement, in a sense shorter then a predetermined air-cut distance, by a predetermined distance, it is considered obvious that the timing of Miyajima would take into consideration proper work positioning prior to actuating to tool, therefore stabilization of a movement would be obvious.

Kakino and Miyajima are analogous art because they are both related to three axis tool operations and control.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize the timing of Miyajima in the machine tool of Kakino because Miyajima teaches machine tool control method, wherein a tool operated by a servo motor controlled by a CNC unit, a positioning of a table for loading a workpiece and the driving of the tool are controlled by a common CNC unit, and as a result, operation can be carried out at a low cost and at a high speed (col. 1 lines 39-45).

Conclusion

28. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Araie et al (U.S. Pat 5,523,953) – teaches a method and apparatus for controlling a machine tool that uses thermal response for feedback, where the workpiece is controlled in the X and Y axis and the tool is controlled in the Z axis.

Noguchi (U.S. Pat 4,409,650) – teaches means for correcting a position according to a time delay in the response characteristic of a driving means.

29. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Paul L. Rodriguez whose telephone number is (571) 272-3753. The examiner can normally be reached on 6:00 - 4:30 T-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo P. Picard can be reached on (571) 272-3749. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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